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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/661,316	09/12/2003	Ken M. Lam	ATM-266	7847
3897	7590	02/23/2005		
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EXAMINER DOLAN, JENNIFER M				
ART UNIT		PAPER NUMBER		
2813				
DATE MAILED: 02/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/661,316	LAM ET AL.	
	Examiner	Art Unit	
	Jennifer M. Dolan	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13-17 is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,12 and 18 is/are rejected.
- 7) ☒ Claim(s) 3,4 and 9-11 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/16/03</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 2, 7, 8, 12, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,661,886 to Nelson et al. in view of U.S. Patent No. 5,742,169 to Akram et al.

Regarding claims 1, 7, 8, and 18, Nelson discloses a low-profile carrier (figure 1; column 3, lines 62-67) for temporarily mounting a non-wafer form device (3) comprising: a test ring holder (top ceramic layers of substrate 11; see column 3, lines 3-10) configured to hold the non-wafer form device (figures 1-3), the test ring holder having a second face (bottom) configured to be bonded to a mechanical support base (lower ceramic sheets in laminated substrate 11, see column 3, lines 3-10); a test ring magnet (16 in figure 2 or 23 in figure 3) configured to be mounted substantially around a second recess formed in the first face of the test ring holder (figures 1-3); a second recess (12) formed within the first face of the test ring holder (figures 1-3) and circumscribed within the test ring magnet (figures 1-3), the second recess forming a mounting location for the non-wafer form device (figures 1-3); and a test ring cover (20) configured to be mounted on the test ring magnet (figures 1-3) and held magnetically in a

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location proximate to the test ring holder (column 2, lines 47-57; column 3, line 54 – column 4, line 12).

Nelson fails to disclose that the cover and test ring magnet are disposed in a first recess surrounding the second recess.

Akram discloses a temporary carrier for a non-wafer form device (column 2, lines 22-42) wherein the cover portion (24) is disposed completely within a first recess, such that the cover is coplanar with a non-recessed portion of the first face (figures 2 and 2A; “first recess” is formed by sides of 14, and a corresponding “second recess” is formed by recess 36).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the package of Nelson, such that the cover portion fits completely in a first recess, the first recess surrounding the die-holding (second) recess, as suggested by Akram. The rationale is as follows: A person having ordinary skill in the art would have been motivated to dispose the cover entirely within a recess of the holder substrate, because doing so allows the package height to be decreased or regulated based on the height of the holder substrate (Akram, column 3, line 65 – column 4, line 5). Additionally, a package in which all of the components are recessed into the profile of the holder provides improved alignment between components and improved integrity and protection of the package, as is appreciated by a person skilled in the art. Since Nelson teaches that the magnets are aligned inwardly from the edge of the cover, the combination of Nelson and Akram, as explained supra, would automatically result in the test ring magnet being disposed within the ‘cover-holding’ recess.

Regarding claim 2, Nelson teaches that the test ring magnet (23’ in figure 3) is attached using an adhesive (column 3, lines 30-35).

Regarding claim 12, Nelson fails to disclose a thru-hole formed in the center of the test ring holder.

Akram discloses a thru hole (48b) formed in the center of the carrier base substrate (see figure 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the chip carrier of Nelson, such that it includes a thru-hole in the center of the base substrate, as suggested by Akram. The rationale is as follows: A person having ordinary skill in the art would have been motivated to provide a thru-hole in the base substrate, because Akram shows that such a structure is useful for allowing vacuum retention and alignment of the die during the assembly of the temporary carrier, as well as allowing for access to the die through the hole for die testing (see Akram, column 4, lines 12-25).

3. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nelson et al. in view of Akram et al. as applied to claim 1 above, and further in view of U.S. Patent No. 5,986,459 to Fukaya et al.

Nelson discloses that the test ring holder is made of layers of ceramic, but fails to teach that the holder could be formed from glass cloth impregnated with resin or from polyimide.

Fukaya discloses a temporary carrier with a magnetically attached lid, wherein the substrates are preferably formed by non-magnetic substances, such as ceramics (alumina), polyimide (PEI is a polyimide), or a glass containing epoxy resin (column 14, lines 55-67).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the test ring holder of Nelson, such that it is formed by the claimed

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materials, as suggested by Fukaya. The rationale is as follows: A person having ordinary skill in the art would have been motivated to use the specified materials, because Fukaya shows that the materials are suitable for use as a temporary carrier, are non-interactive with the lid-holding magnets, and can be used interchangeably with a common ceramic, such as alumina (see Fukaya, column 14, lines 55-67).

Allowable Subject Matter

4. Claims 13-17 are allowed.
5. Claims 3, 4, and 9-11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. The following is a statement of reasons for the indication of allowable subject matter:
The primary reason for allowability is that the prior art generally has few teachings pertaining to die carriers having magnetically coupled lids, such that it is not reasonable to modify the cited prior art to meet the claimed limitations.

Regarding claims 3 and 4, Nelson, for example, teaches a carrier structure vastly exceeding the specified thicknesses (the lid of Nelson, alone is about equal to the claimed thickness of the entire package). Since one of the important aspects of the present invention is the reduction in the total height of the carrier, and since the prior art generally does not teach configurations in which a carrier having a magnetically bound lid can approach such small

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profiles, it is the Examiner's opinion that the claimed dimensions are critical and unobvious to a person skilled in the art.

Regarding claims 9-11, although the prior art teaches that permanently magnetic materials can be used to form relatively small magnets bound to the carrier and the lid, the prior art further suggests that even these magnets generate magnetic fields that detrimentally affect the chip (see Fukaya, column 4, lines 12-20, for example). Hence, the prior art teaches away from forming the test ring cover or the test ring holder from a permanent magnet material.

Regarding claims 13-17, Akram does teach mounting an insert in the second recess on top of the thru-hole, such that the insert is in communication with the support base. There is no suggestion in the prior art, however, of mounting an insert within the thru-hole. Since this modification further reduces the profile of the carrier by eliminating the added thickness of the insert, this limitation is considered critical and unobvious to a person having ordinary skill in the art.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. U.S. Patent No. 6,467,627 to Troxtell Jr. discloses a low profile tape carrier for non-wafer form devices.
- b. U.S. Patent No. 6,142,361 to Downes, Jr. et al. discloses a chip carrier using permanent magnet plates for securing the carrier.

- c. U.S. Patent No. 5,669,599 to Toh et al. discloses a wafer boat system wherein the chips are affixed to a holder using permanent magnets.
- d. U.S. Patent No. 5,247,248 to Fukunaga discloses a wiring board wherein the integrated circuits are held between the board and a magnetically bound cover.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer M. Dolan whose telephone number is (571) 272-1690. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W. Whitehead, Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jennifer M. Dolan
Examiner
Art Unit 2813

jmd


CRAIG A. THOMPSON
PRIMARY EXAMINER